CHAPTER 9

SHIP MAINTENANCE AND MODERNIZATION

900. GENERAL POLICY. The Navy's ship maintenance and modernization policy is that the Fleet shall be combat ready and fully capable to meet the expected threat, and that the material condition of its ships will allow them to accomplish their assigned missions. Required maintenance and modernization should therefore be performed as an integral part of combat readiness and at the lowest effective level throughout the ship's life cycle.

901. OBJECTIVES. The Ship Maintenance and Modernization Program implements this policy and has two major objectives aimed at providing the maximum operational availability to Fleet Commanders:

a. Maintain and/or increase fleet material readiness.

b. Modernize existing ships to enhance combat capability, incorporate safety alterations, introduce mandated environmental improvements, and support the first objective by installing other authorized alterations that improve reliability and maintainability.

910. SHIPS' 3-M SYSTEM. The 3-M System (the Navy Ships' Maintenance and Material Management System) is an integrated management program to improve control and accomplishment of required ships' maintenance and to provide standardized maintenance data collection and dissemination. The 3-M System is comprised of the Planned Maintenance System for the management and control of preventive maintenance on operational equipment; and the Maintenance Data System used to report and manage corrective maintenance on all categories of equipment.

The 3-M System is the nucleus for managing maintenance aboard all ships and shore stations of the Navy. They provide all maintenance and material managers throughout the Navy with the means to plan, acquire, organize, direct, control, and evaluate manpower and material resources expended or planned for expenditure in support of maintenance.

The term maintenance includes servicing, repair, modification, modernization, overhaul, conversion, rebuild, test, reclamation inspection and condition determination. This maintenance affects initial provisioning and reprovisioning of support items.

The 3-M System is designed to optimize performance of on-going maintenance actions which are subsequently documented, analyzed, and fed back into the management, engineering, and supply

programs to improve future maintenance efforts. As a result, the systems have evolved into a realistic balance between maintenance requirements, including data requirements, and the administrative work load on the maintenance team.

Maintenance management includes supervision of maintenance actions and planning of maintenance efforts. In referring to management, the term is used in its broadest sense, including the work center on the ship as well as Navy Headquarters in Washington.

911. 3-M SYSTEM OBJECTIVES. The primary objective of the Ships' 3-M System is to provide for managing maintenance and maintenance support in a manner which will ensure maximum equipment operational readiness. To this end, the intermediate objectives of the 3-M System are as follows:

a. Achieve uniform maintenance standards and criteria.

b. Use available manpower and material resources effectively in maintenance and maintenance support efforts.

c. Document information relating to maintenance and maintenance support actions.

d. Improve maintainability and reliability of systems and equipment through documentation of maintenance information for analysis.

e. Provide the means for reporting ship configuration changes.

f. Identify and reduce the cost of maintenance and maintenance support in terms of manpower and material resources.

g. Reduce the cost of accidental material damage by means of accurate identification and analysis of the cost.

h. Provide the means to schedule, plan, manage, and track maintenance actions.

i. Provide data on which to base improvements in equipment design and in spare parts support.

912. 3-M SYSTEM SCOPE. The 3-M System, as described herein, is fully applicable to all ships, service craft, small boats, and nonaviation fleet test and support equipment. Also included are the Navy Meteorological Equipment, Naval Air Traffic Control, Air Navigation and Landing Systems (NAALS), and equipment of the Commander Naval Reserve Force and Chief of Naval Education and

Training activities. Shore activities with equipment which is identical to shipboard equipment shall request their activity be added into the system.

The Ships' 3-M System includes all equipments installed in or in support and custody of ships except fleet ballistic missile weapon systems, nuclear power plants, and associated test equipment. Ships, service craft, and small boats operated and maintained by civilian crews are also exempted from the requirements of the 3-M System.

Directives issued by the Nuclear Power Directorate, Naval Sea Systems Command (NAVSEASYSCOM)(SEA 08) and the Director Strategic Systems Program Office (DIRSSPO) take precedence over the procedures of the 3-M System for the maintenance of equipment under their cognizance. However, this does not exclude the use of various portions of the 3-M System as management aids for maintaining these equipments. Type Commanders will issue amplifying instructions specifying application of the 3-M System for nuclear power plants and strategic weapons systems in conformance with NAVSEASYSCOM (SEA 08) and Strategic Systems Project Office policy.

913. PLANNED MAINTENANCE SYSTEM. The Planned Maintenance System (PMS) provides a simple and standard means for planning, scheduling, controlling, and performing planned maintenance on all equipment, and represents an efficient means for using available maintenance resources.

PMS maintenance actions are the minimum required to maintain equipment in a fully operable condition, and within specifications. If performed according to schedule, these maintenance actions will provide the means to identify parts requiring replacement prior to failure. PMS procedures are preventive in nature. They are designed to prevent equipment failures which might otherwise result in repeated corrective maintenance actions.

PMS procedures and the periodicities at which they are to be accomplished are developed based on sound engineering practice, practical experience, and technical standards. Maintenance Requirement Cards (MRCs) provide the detailed procedures for performing the preventive maintenance and state who, what, when, how, and with what resources a specific requirement is to be accomplished. Some MRCs have Equipment Guide Lists (EGLs) accompanying them to serve as location guides for identical equipments, such as motors, controllers, valves, life rafts, deck fittings, CO2 bottles, etc., which are impractical to schedule individually for routine, periodic preventative maintenance.

PMS procedures are developed by the activities and offices of the Naval Sea Systems Command responsible for the development and procurement of the systems/equipments for active, new construction, major conversion and activation of ships, boats, and craft. PMS Maintenance Index Pages (MIP) and MRCs are developed as part of the Integrated Logistics Support (ILS) effort for all new procurements, reprocurements, alterations, and modifications of systems and equipments. Changes to PMS are issued by the Naval Sea Support Centers (NAVSEACENs), Atlantic and Pacific.

914. MAINTENANCE DATA SYSTEM

a. The Maintenance Data System (MDS) provides a means for recording the expenditure of resources (personnel, material, and time) associated with maintenance actions. MDS is the means by which maintenance personnel report corrective maintenance actions on all categories of equipments. The basic premise of the MDS is that maintenance data will be recorded once and only once by fleet personnel. The MDS data bank, not the maintenance activity, will thereafter provide information that is needed. The following reporting qualifications apply to the scope of MDS:

(1) Submarines and all ships configured with Organizational Maintenance Management System (OMMS) are to report all maintenance actions.

(2) Maintenance actions deferred for outside assistance are reported by all ships for all such maintenance actions. Subsequent actions by Intermediate Maintenance Activities (IMAs) also will be reported.

(3) Ship's force report all maintenance actions on designated selected equipment.

(4) All ships report all maintenance actions directed by Fleet Commanders in Chief (FLTCINCs) and Type Commanders (TYCOMs).

(5) All ships and activities report all maintenance actions resulting in a configuration change.

From the deferred maintenance reported, a Current Ship's Maintenance Project (CSMP) file is developed by the ship or automated data processing facility designated by the TYCOM. From the CSMP file a series of reports are available that detail and summarize the deferred maintenance information. By-products of the CSMP include automated work packages, pre-Inspection and Survey (PRE-INSURV) packages, etc.

The Naval Sea Logistics Center (NAVSEALOGCEN) has been designated the focal point for receipt and distribution of the maintenance and material information reported. From the 3-M System central data bank maintained at NAVSEALOGCEN, numerous reports are programmed and available upon request by any command. These reports yield data on equipment maintainability and reliability, man-hour useage equipment alteration status, material useage and costs, and fleet material condition. Reports are available to both the operating forces and shore facilities. General information on NAVSEALOGCEN and how to obtain products can be found in the 3-M Manual (OPNAVINST 4790.4B) (NOTAL). Products available through NAVSEALOGCEN can be found in the Ships' 3-M Data System Users Manual (NAVSEA SL790-AB-URM-010/3-M) (NOTAL).

Direct requests to the fleet for data imposes an unnecessary burden on the operating forces. The policy of the CNO is to minimize requests to the fleet for data that is available from NAVSEALOGCEN. Before a nomination/request for additional or specialized reporting requirements can be made to the Naval Sea Systems Command, the requesting activity must query the NAVSEALOGCEN to ensure the data is not already being reported and available. Any request for specialized reporting requirements must include the phrase, "The NAVSEALOGCEN data bank has been queried and the data is not available." Without this certification, fleet units are authorized to deny the request.

b. MDS includes the following:

(1) Documentation provided by shipboard personnel incident to shipboard maintenance actions. This documentation describes what was done or needs to be done, why it was done or why it needs to be done, who did it or who needs to do it, and what resources were used or are needed.

(2) The means for producing an CSMP.

(3) The means for producing work requests for intermediate maintenance activity and shipyard use.

(4) The means for scheduling of periodic calibration, test, inspection, checks, and refurbishment requirements.

(5) The means for producing automated PRE-INSURV deficiency listings.

(6) The means for material procurement of periodic maintenance requirements.

(7) The means for producing reports tailored to meet the unique needs for all the various types and levels of management throughout the Navy.

(8) The tools necessary to effectively manage and control intermediate maintenance activity workloads.

(9) The means for reporting actions and material conditions of equipment by accomplishing activities.

(10) The means for the Fleet to report changes to the configuration of equipment installed in ships. Incident to such reporting is the capability to update a ship's PMS coverage as well as an automatic means of ordering technical documentation for newly installed equipment.

(11) The means for depot level activities to inform the Fleet of estimated and actual resources expenditures.

(12) The means for managing alterations.

915. COMMAND RELATIONSHIPS AND RESPONSIBILITIES. The 3-M System operates under policy guidance from the CNO and is the principal system for data collection at the source. The technical direction of the 3-M System is provided by the Naval Sea System Command.

These centralized authorities do not relieve commands of the operating forces of responsibility for proper operation of the 3-M System in the Fleet, nor the responsibility for informing appropriate seniors in the chain of command concerning conditions which affect material readiness. The effective performance of the Planned Maintenance System and the Maintenance Data System remain the responsibility of command.

The 3-M System is not a permissive system. The key to success is active command attention and aggressive supervision at all levels from operational command to the work center supervisor. The development and use of Maintenance Data System products at all levels of command are necessary and must be emphasized if the full potential of the system is to be realized. All commands are encouraged to develop management applications from the MDS. If such development requires modification to or additional program support, the request must be presented to the CNO via the TYCOMs and FLTCINCs for evaluation/concurrence.

920. UNAUTHORIZED ALTERATIONS. No alterations shall be made unless previously approved and authorized for accomplishment by competent authority.

930. SHIP MAINTENANCE AND MODERNIZATION POLICIES. It is the policy of the Navy that ship maintenance and modernization work will be performed at the lowest effective level throughout the life cycle of the ships. Specific policies concerning the maintenance and modernization of ships are found in OPNAVINST 4700.7J (NOTAL) 1 and 2 which includes an extensive bibliography of maintenance-related directives, and OPNAVINST 4720.2F (NOTAL) which sets policy for development, planning, programming, funding, and accomplishment of ships' alterations.

940. LEVELS OF MAINTENANCE. There are three levels of ships' maintenance and modernization: organizational (shipboard), intermediate, and depot. Each successive level provides a greater degree of capability. Organizational level maintenance and intermediate level maintenance are within the capability and are the responsibility of the operating forces. The greatest industrial capability resides within the depot level, comprised of naval and private shipyards, the ship repair facilities, and designated overhaul points.

941. ORGANIZATIONAL (SHIPBOARD) LEVEL MAINTENANCE. Organizational level maintenance is the corrective and preventive maintenance which is the responsibility of and performed by the ship's crew on its assigned equipment. It normally consists of inspecting, servicing, lubricating, adjusting, and the replacing of parts, minor assemblies, and sub-assemblies. This is normally shipboard maintenance of equipment, unit or aircraft squadron maintenance, including scheduled preventive maintenance; and in the case of Civil Engineering Support Equipment (CESE), service station or field servicing.

941.1 IMPLEMENTATION OF ORGANIZATIONAL LEVEL MAINTENANCE. The individual ship shall be self-sufficient to the maximum extent achievable within existing manpower and equipment allowances. The Planned Maintenance System (PMS) described in the 3-M System Manual (OPNAVINST 4790.4B) defines the minimum scheduled preventative maintenance program to be carried out aboard each ship and shall be used to the maximum extent possible. Where the PMS is not available, existing technical manuals and instructions issued by cognizant systems commands are applicable.

942. INTERMEDIATE LEVEL MAINTENANCE. Intermediate level maintenance is preventive and corrective maintenance which is the responsibility of and performed by designated maintenance activities for direct support of using organizations, such as that performed by qualified personnel with specialized facilities and training aboard tenders, repair ships, and aircraft carriers, and at fleet support bases, and Shore Intermediate Maintenance Activities (SIMA). It normally consists of calibration; repair or replacement of damaged or unserviceable parts, components, or

assemblies; emergency manufacture of nonavailable parts; and providing technical assistance to using organizations.

942.1 IMPLEMENTATION OF INTERMEDIATE LEVEL MAINTENANCE. Intermediate level maintenance activities use the 3-M System to develop and process the maintenance actions to be performed during Intermediate Maintenance Activity (IMA) upkeep periods. Forces afloat and fleet support activities shall accomplish intermediate level maintenance to the maximum extent feasible consistent with the availability of material, funds, and skilled personnel.

943. DEPOT LEVEL MAINTENANCE. Depot level maintenance is maintenance which is the responsibility of and performed by designated maintenance activities to support organizational level maintenance and intermediate level maintenance activities by the use of more extensive shop facilities, equipment and personnel of higher technical skill than are available at the lower levels of maintenance. It normally consists of inspection, test, repair, modification, alteration, modernization, conversion, overhaul, reclamation or rebuild of parts, assemblies, sub-assemblies, components, equipment end items, and weapon systems; the manufacture of critical non-available parts; and providing technical assistance to intermediate maintenance organizations, using and other activities. Depot level maintenance is normally accomplished in fixed shops, shipyards and other shore-based facilities, or by depot field teams. The type commander or cognizant systems command shall determine what work is scheduled for depot level maintenance. Depot level maintenance is performed by the Naval Aviation Depots (NAD), depot field teams, Naval Ammunition Depots, Naval Ordnance Stations, Naval Weapons Stations, Naval Torpedo Stations, Polaris Missile Facilities, Strategic Weapons Facilities, contractor depot level rework activities, and at commercial facilities or Navy shipyards (including Ship Repair Facilities) during availabilities or designated voyage repairs (restricted, technical, regular overhaul, and the like).

950. THE NAVAL AVIATION MAINTENANCE PROGRAM. The Naval Aviation Maintenance Program (NAMP) as implemented by OPNAVINST 4790.2H (NOTAL), provides an integrated system for performing aeronautical equipment maintenance and all related support functions. The methodology for achieving the spirit and intent of the NAMP objective is labeled "performance improvement." Performance improvement is an "all hands" effort which focuses on service and close support to customers. As a primary prerequisite, the mission must be clearly understood and communicated to everyone in the organization. It is essential all personnel know their job, understand their contribution to mission accomplishment, and be sensitive to customer

requirements. New or improved cost effective capabilities and processes must be continuously pursued. Mutually supporting teamwork, constant communication, and compatible measures are critical elements for success.

951. PURPOSE. The purpose of OPNAVINST 4790.2H (NOTAL) is to issue the maintenance policies, procedures, and responsibilities for the conduct of the NAMP at every level of maintenance throughout naval aviation. It outlines command, administrative, and management relationships and establishes policies for the assignment of maintenance tasks and/or responsibilities for the conduct of the NAMP.

952. OBJECTIVES. The objective of the NAMP is to achieve the aviation material readiness standards established by the CNO, with optimum use of manpower, material, and funds. CNO's aviation material readiness standards include the repair of aeronautical equipment and material at that level of maintenance which ensures optimum economic use of resources; the protection of weapon systems from corrosive elements through the prosecution of an active Corrosion Control Program; the application of a systematic planned maintenance program; and the collection, analysis, and use of data in order to effectively improve material condition and safety. The Naval Aviation Plan details logistics actions which will allow the maximum opportunity to achieve this objective.

More detailed information concerning the operation and use of the NAMP may be found in OPNAVINST 4790.2H (NOTAL).

960. BIBLIOGRAPHY

Maintenance Policy for Naval Ships
(OPNAVINST 4700.7J)

Fleet Modernization Program (FMP) Policy
(OPNAVINST 4720.2G)

Naval Aviation Maintenance Program (NAMP)
(OPNAVINST 4790.2H (NOTAL))

Ships' Maintenance Material Management (3-M) Manual
(OPNAVINST 4790.4C)

Naval Ordnance Maintenance Management Program
(OPNAVINST 8000.16)